UNITED STATES DEPARTMENT OF AGRICULTURE

Summary of Exhibit

# DAIRY TYPE AND BEEF TYPE COMPARED

This exhibit shows some of the results obtained from a study of the external form, the internal anatomy, and the skeletal structure of a highly specialized dairy cow, a highly specialized beef cow, and a dairy bull.

Those viewing the exhibit will first observe three skeletons with their heads through a screen. An invitation is extended to all to study the structural differences between them and to identify the skeleton of the dairy cow, dairy bull and beef cow.

Provision is made for verifying one's judgment by examining the heads of the skeletons and photographs, drawings, and tabular material showing the differences which existed in the living animals as well as in the skeletons. A broadside photograph of each animal taken while living appears directly above the head of its skeleton.

One panel shows photographs of the gross structure of the udders of the two cows. The dairy cow's udder was composed almost entirely of secreting tissue. The beef cow's udder had only a very small area of secreting tissue directly above the teat, imbedded in a large mass of fat.

Another section of the exhibit shows the contours, or cross-section outlines, of the external form of the two cows and of the dairy bull. The deep narrow shape of the dairy cow as compared with the rounded conformation of the beef cow is distinctly shown.

A third section shows the cross-section outlines of the fore chest and paunch of the skeletons of the three animals. The relatively deep, narrow

fore chest of the dairy cow and the highly arched ribs in the region of the paunch of the beef cow are clearly illustrated.

A fourth section gives a brief outline of some of the most striking points of difference or similarity between the external conformation, the internal anatomy, the mammary development, and the skeletal structure of the two cows. They are as follows:

The Dairy Cow was:

In External Form:
638 pounds lighter in weight.
Taller at the withers, longer in body, and greater in "Scale".
Much smaller in circumference.
Deeper in proportion to width.
About 40 per cent less in volume of barrel.
About 16 per cent less in body surface area.
Distinctly more wedge shaped laterally.
Distinctly less wedge shaped vertically.

In Internal Anatomy:
Remarkably similar to beef cow in internal anatomy or size of organs.

In Mammary Gland Structure:
Strikingly superior in the quantity of secreting tissue. Her udder was filled with secreting tissue, whereas that of the beef cow contained only a small quantity imbedded in fat.

In Skeletal Structure:
Somewhat taller and longer.
Deeper but slightly more narrow in fore chest.
Similar in width of paunch but less arch of rear ribs.
Almost equal in wedge shape laterally.
Decidedly more wedge shaped vertically.
Openings (called foramina) for nerves and blood vessels are considerably larger than in beef cow.
In both cows, nearly all foramina are through rather than between the vertebrae.
Generally very similar to the beef cow in skeletal structure.

Aside from the external form, the most marked difference between the two cows was the quantity of secretory tissue in their udders.

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Care of Milk and Cream

After milk has been properly produced it is essential, if quality is to be maintained, that it be properly handled. The best way to prevent multiplication of bacteria which unavoidably get into milk is to cool the milk as soon as possible after it is produced and keep it cold. Bacteria are tiny, single-celled plants, which, like most other plants, require warmth if they are to grow. If milk is cooled to 50°F. or below and held at that temperature, bacterial development is very much retarded.

Milk utensils which are not properly washed and sterilized may be the greatest source of milk contamination. Therefore, they should be rinsed inside and outside with lukewarm or cold water as soon as possible after use. They should then be placed in a wash vat, scrubbed with a brush in warm water containing a soda ash or alkaline washing powder (not soap), rinsed, placed in a sterilizing cabinet, and thoroughly steamed.

This exhibit shows the necessary equipment for the proper handling of milk after it is produced. The main features of the exhibit are a milk cooler with the milk flowing over it, a storage vat containing cans of milk, and a modern steam sterilizer for dairy utensils. Extensive research and actual practice have shown that this equipment is both practical and efficient in maintaining the quality of milk after it is produced.

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How to Produce Clean Milk

The essentials for the production of quality milk are contained in this exhibit, the outstanding feature of which is a mechanical cow being milked by a mechanical man. The cow is clean and well groomed. The hair on the udder, belly, and flanks is closely clipped, making it easier to keep her clean. The milker wears clean clothing and has clean, dry hands.

A desirable factor in the production of clean milk is shown in this exhibit -- a clean, well ventilated, and well lighted dairy barn. It is of good construction with floors and gutters made of impervious material. A small-top pail is being used, as this type of pail keeps a large part of the falling hair and dirt out of the milk.

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# SELECT BULLS THAT WILL INCREASE HERD PRODUCTION

This exhibit is based on an investigational study of 700 sires used in dairy-herd-improvement associations, and shows that as butterfat production per cow advances bulls of greater merit are needed to increase production of daughters over dams.

Each of these sires had five or more daughters whose yearly milk and butterfat records were compared with the records of their dams. The figures show that all the sires mated with cows having an average yearly butterfat production below 200 pounds had daughters that excelled their dams. Other bulls of this group were mated with cows averaging between 200 and 299 pounds of butterfat a year, in which case the daughters of 86 per cent of the sires excelled their dams. Of the sires mated with cows averaging from 300 to 399 pounds of butterfat per year, only 72 per cent of the bulls had daughters that excelled their dams. Of those mated with cows averaging 400 to 499 pounds, the daughters of only 47 per cent excelled; of those mated with cows averaging 500 to 599 pounds, the daughters of only 40 per cent excelled. Of those sires mated with cows averaging 600 pounds of butterfat or more, all of the daughters had a lower average than their dams.

These figures show that as our dairy herds increase in average production per cow, it becomes more difficult to find bulls that are able to increase production of daughters over dams. It may be satisfactory to select bulls on the strength of type and pedigree for low-producing herds, but for herds averaging 300 pounds of butterfat or more, only bulls that have already demonstrated their ability to increase production in such herds should be selected. These facts are illustrated in a mechanical way in the exhibit by means of ten bulls starting up an incline and dropping out as their capacity to transmit production is reached. Only the best bulls reach the top.

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## USE OF DAIRY BY-PRODUCTS IN COOKING

This exhibit shows the improvement made in baked products by the addition of concentrated sour skim milk and dry skim milk. The use of skim-milk solids in bread making, for instance, generally improves the volume, texture and color of the loaf. The effect of the skim-milk solids on the character of the loaf varies with the kind of flour used.

Samples of bread, cakes, waffles, and cookies made with and without the addition of skim milk will be on display. The method of adding concentrated sour skim milk to the baked product will be demonstrated and the baking will be carried on in a kitchen which forms part of this exhibit. Samples of the skim-milk products themselves can be seen on display.

Through the efforts of the Bureau of Dairy Industry it is now possible to make a concentrated sour skim milk of standard composition and excellent keeping qualities. The use of this self-preserving milk by-product is advocated in foods in which sour milk is ordinarily a part of the recipe. It is believed that this concentrated sour skim milk will be welcomed by restaurant owners and when put up in attractive containers and made available at grocery stores will be in demand by the housewife because of its convenience and uniform quality.

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WHICH JOB DO YOU WANT?

They pay the same

It will not take any one long to decide which job he wants after a single glance at the exhibit. On one side are shown 13 low-producing cows that for the labor of feeding, managing, and milking return a total yearly income over cost of feed of only $182. On the other side is shown one high-producing dairy cow that also returns a yearly income over cost of feed of $182. This one cow pays the same income over cost of feed as do the 13 cows.

This exhibit is based on a tabulation of the yearly records of over 100,000 cows in dairy-herd-improvement associations. It shows that the cows that produced 100 pounds of butterfat a year average an income over cost of feed of only $14, the cows that produced 200 pounds of butterfat had an income over cost of feed of $55, the 300-pound cows, $96, the 400-pound cows, $138, and the 500-pound cows $182. One cow producing 500 pounds of butterfat a year, therefore, returned as much income over cost of feed, as did 13 cows each producing 100 pounds of butterfat a year. Certainly no one would knowingly milk and care for 13 cows when one good cow will give the same returns.